

DATE: 10/04

SUBJECT: \_\_\_\_\_

Fundamentals of industrial instrumentation AND process control.

هذا العناصر ميكانيك ولكن معاشرات الخطأ تتحقق جزء بدل ذلك في أول المفاهيم

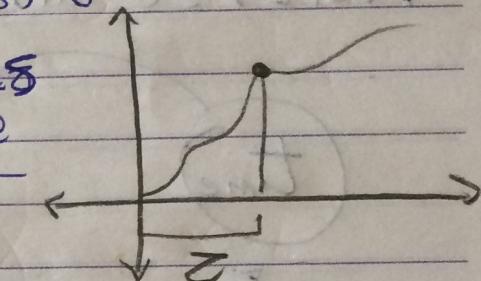
$$\frac{dx}{dt} = \dot{x} = ax + bu + b_1 u(t-2) \quad \text{--- 25}$$

$$s x(s) - x_0 = a x(s) + b_1 u(s) + b_2 u(s) e^{-2s} \quad \text{--- 25}$$

$$(s-a)x(s) = x_0 + b_1 u(s) + b_2 u(s) e^{-2s} \quad \text{--- 20}$$

$$x(s) = \frac{x_0}{s-a} - \frac{b_1 u(s)}{s-a} + \frac{b_2 u(s) e^{-2s}}{s-a}$$

هذا هو Laplace عجز



$$* e^{-2s} \quad z \leftarrow s-1 \quad \text{لذلك حل نقل}$$

$$s^2 e^{-2s} x(s) - e^{-2s} x_0 = a \ell + b_1 e^{-2s} u(s) + b_2 u(s) e^{-2s} \quad \text{--- 25}$$

$$\frac{d}{dz} e^{-2s} x(s) =$$

$$\frac{d}{dz} F(z, s) = f(z, s) + e^{-2s} x_0 + b_1 e^{-2s} u(s) + b_2 u(s) \quad \text{--- 25}$$

$$F(z, s) = F(s, 2) +$$

$$\theta F(\theta, s) - x(s) = f(\theta, s) + \frac{x(0)}{\theta-s} + \frac{b_1 u(s)}{\theta-s} + b_2 u(s) \quad \text{--- 25}$$

$$(\theta-1) F(\theta, s) = x(s) + \frac{x(0)}{\theta-s} + \frac{b_1 u(s)}{\theta-s} + b_2 u(s) \quad \text{--- 25}$$

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$$F(\Theta, s) = \frac{X(s)}{\Theta - 1} + \frac{X_0}{(\Theta - s)(\Theta - 1)} + \frac{b_1 U(s)}{(\Theta - s)(\Theta - 1)} + \frac{b_2 U(s)}{(\Theta - 1)}$$

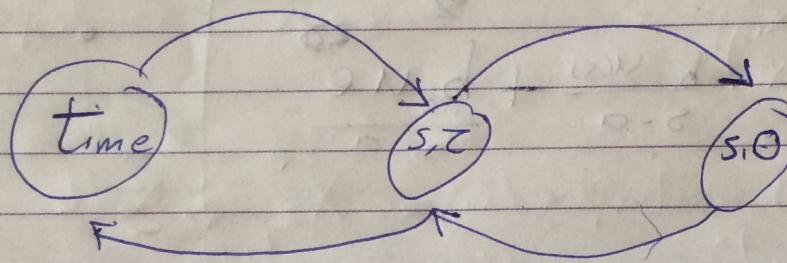
inverselaplace.

$$f_1(s) = e^2 x(s) + (e + e^2) x + (e^2 + e^3) u(s) + b_2 e^2 u(s)$$

$t \leftarrow s$  now

Inverse Laplace

$$f(z, t) = e^z X(t) + X_0 (K e^z U_s(t))$$



digital control  $\Rightarrow$  multi decision.

analogue  $\rightarrow$  single decision

Data acquisition  $\Rightarrow$  Sensors measure  $\| \cdot \|$

manipulated variables  $\Rightarrow$  المتغيرات التي يسيطر عليها الباحث.

Set point  $\Rightarrow$  desired point  $\Rightarrow$  goal

actual OIP  $\geq$  desire OIP (surplus)

Controller  $\Rightarrow$  Transient (جذب)  $\circ =$  Controller (جذب)

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\* Transient IP ~~are~~ is suddenly change. Crossed \*